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Facilities Modernisation Project, South Auckland Health:

Planning and Delivering Health Sector Capital Projects in New Zealand in the Context of Organisational Change

1. ABSTRACT

The objective of this paper is to communicate key lessons learnt and information gathered during five years of facilities upgrading and modernisation undertaken by South Auckland Health (SAH), (lately Counties Manukau District Health Board (CMDHB)). SAH is a 900-bed tertiary teaching health provider based in South Auckland, New Zealand, and servicing a population of about 400,000. It consists of a main hospital campus, Middlemore (700 beds), a new elective surgery hospital at Manukau, two ambulatory care centres and five regional health care centres. It has 4,200 employees.

The discussion points and recommendations in this paper are provided as sometimes provocative views, to stimulate discussion and provide a structure for pre-project workshops or a start-up tool for organisations undergoing change. The paper should not be read as offering “the answer”, or the correct or only methodology, but more as a step towards consolidating our knowledge and skills in the New Zealand market.

It does not give a full historical account of the project, and issues will be discussed only where it is deemed to be of value, and where they go beyond Project Management disciplines. The paper will address a wide range of issues, spanning the wider health environment including the strategic thinking on Middlemore's future. At the other end of the spectrum it will explore the “softer” skills” and management processes required to retain energy, discipline and focus in changing health business environments.

A particular emphasis will be given to project governance and the integration of evolving business needs during the execution of a very large project. In the public sector environment diligent governance is necessary at many levels. For example the NZ Health Strategy must be implemented in all public projects undertaken on behalf of the government, the Ministry of Health (MOH), the NZ Audit Office and the local District Health Board, local communities, staff, Iwi, media and the wider community. Programme delivery must be executed by a receptive design team and building contractor within this complex stakeholder

mix. Integrated strategic governance across all these organisations (or high-level teamwork) is therefore essential.

These stakeholders must consider aspects of both current and future health environments, including demographic and disease trends, and the impact of IT, medical technology and of new processes. Obviously, these complex and changing requirements must be converted into a functional built environment via designers and contractors, to create an appropriate, effective and future-proofed facility for clinicians, support staff and patients.

The paper will therefore endeavour to provide some practical recommendations for CEOs, GMs and Project Managers working with – or representing – clients in the health-care setting. It should though be equally useful for any organisation moving through business and process change associated with upgrading facilities or infrastructure.

The report will address various stages of the project including:

- strategic and business considerations
- master planning, concept and detail design
- clinical and user-group input and management involvement
- project control and reporting systems
- project governance
- construction / design procurement
- set-up, transition into and commissioning of facilities

Information and medical technology and their relevance to system and process design and implementation is a huge and essential part of the evolution modern health business, and for clarity it needs to be treated separately. It will not be considered in detail in this paper; suffice it to say that it must be treated as a critical project task both in the early strategic phase and later regarding detailed design. The impact of technology in the new

age of preventative primary care and patient management through secondary and tertiary care must be considered.

Change management is a theme underlying all of the above. Leadership is required for effective organisational change to happen and staff must be trained and enthused about leadership. This is necessary not only to effect the necessary shifts in organisational culture, but more specifically to embed process changes and operational improvements associated with changes to the physical environments, for the long term.

2. ACKNOWLEDGEMENTS

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3. CAPITAL PROJECTS IN THE HEALTH SECTOR

For hospital rebuilding and modernisation to be sensible, relevant and responsible, it must be done within a concept of overall strategic health planning. "Sensibly before one begins on the major reconstruction of a hospital, an analysis of the healthcare system in the future and the forms that will shape it are fundamental. What is needed is information that combines facility-based utilisation with population based treatment rates" (McKee & Healey, 2001)

Hospital reconstruction and the building of associated infrastructure (including IT) are the most significant areas of capital investment in most health systems. Such capital investment decisions must be carefully thought through with a view to the future and changing environments.

An examination of the forces at work in health in general (in New Zealand and in similar health economies internationally) clearly indicates that the concept of a large tertiary teaching hospital as the critical hub of healthcare delivery is an outdated concept. We are moving into an age when the concept of the "boundaryless" hospital is relevant.

In particular, the rise of technology for the rapid communication of clinical information, increasing patient expectations and improved knowledge mean that the concept of delivering everything at one physical point is fast becoming irrelevant.

"The hospital has reached an evolutionary branch. The fundamental nature of hospitals is about to change because of the application of information and clinical technology, changing medical practices and economic rationalisation." (Braithwaite Vining & Lazarus 1994). A future healthcare system will be much more "distributed" across the community. Many of the problems in health systems today arise from the fragmentation of the general practitioner/primary sector and the hospital sector. A new concept of care, integrating primary with hospital care, is far more relevant to future patient welfare, and will be underpinned by technology.

To be effective then, major hospital reconfiguration has to recognise that healthcare in the future will be delivered with emphasis on ambulatory, community and primary care, and on low-cost preventative solutions. This must be taken into account in developing a master plan.

This is particularly relevant to South Auckland where we have not only advances in technology and patient/staff expectations, but also a massive increase in chronic disease (such as diabetes), and a rapidly increasing winter capacity problem at Middlemore Hospital. Middlemore (700 beds) was built in two main stages in the 1940s and early 1960s at the northern end of the South Auckland catchment. While it was recognised that in the long term, (say 10 to 20 years) two hospitals would be needed in South Auckland, one of the two will be at Middlemore. This meant that economically it was sensible to begin to modernise the Middlemore site and allow for a second hospital in the longer term. The economics are simple and compelling: to rebuild would have cost some \$350 million, whereas Middlemore was completely modernised (including IT) for \$160 million. A strategy of integrated care, which manages people in the community with a programme of early intervention and prevention, was put in place to delay the need for a second acute hospital.

The modernisation of the Middlemore campus was critically necessary. However residents also expected care in remote locations, and this was being advanced by developments in diagnostic techniques such as digital radiology, and IT advances which meant that clinical information could be transferred rapidly between different providers.

Most patient interfaces in contemporary hospital systems do not involve inpatients. Indeed, as lengths of stay reduce, many western hospital systems have reduced their bed numbers considerably, New Zealand being no exception. To give some scale, in South Auckland Health (SAH) each year there are 1.2 million GP consultations, 2 million pharmacy prescriptions, 250,000 hospital outpatient attendances and only 60,000 inpatient hospital attendances. We needed to decongest Middlemore Hospital, which had reached a saturation point at 700 beds and the limit of economies of scale, by

moving services, particularly high-volume outpatient services, off site.

The modernisation programme had three main components

The first part was the building of SuperClinics™ or ambulatory care centres, which, in conjunction with general practice and community A&E services, would deliver 250,000 (and growing) outpatient consultations close to where the patients lived in a community-based setting. The first two centres, one at Howick/Pakuranga and the other at Manukau, also provided health services closer to the community. The Manukau site was then chosen as the future second secondary hospital.

The second component was the modernisation of the Middlemore site itself. The hospital would no longer be the centre of the healthcare system, but a component in a new, distributed health care system. We set capacity limits for each area and recognised two main determinants:

i) The hospital needs to be acuity-focussed. We call this “front loading” the hospital, which means delivering the most effective specialised intensive medicine and therapy early on for the patient, ensuring the best of outcomes. If high-expertise interventions can be delivered to the patient in the first 24 hours, the improvement in patient outcomes and reduction in the length of stay is marked.

ii) There are moves towards different treatment models with lower costs relative to acuity once initial acute care is completed. Rehabilitation units, observation units, discharge facilities and “hospitals in the home” were all embedded into the design of Middlemore Hospital.

iii) Heavy use will also be made of Information Technology. It allows remote diagnostics, and the transfer of information between facilities, and has led to the development of patient centres where clinical information can be accessed quickly.

The issues that caused us the most difficulty related to information technology and systems. We had to deal with new implementation processes, new software and new communications networks (including wireless). They were needed to give clinicians the information they needed to improve patient flow and treatment processes.

We cannot emphasise enough the value of first-class project management and detailed analysis of IT requirements. IT is a relatively new discipline and it requires critical expertise in organising the construction and commissioning processes.

iv) Various non-clinical stakeholder groups, including Unions and cultural groups, were brought in at the very

beginning of the design process. Job design is critical and we found that Union involvement was not (as some expected) disruptive, but valuable and supportive.

v) There is increasing specialisation in healthcare delivery, which we needed to recognise in developing areas such as paediatric emergency care and the separate children's hospital. Clinical expertise, architecture, aesthetics and medicine delivery are markedly different from other areas, all of which had to be recognised.

vi) The most critical long-term cost item in hospital design is NOT the construction cost itself – it is the staff costs of the implications of the design. Amortised over, say, 40 years, the capital costs are negligible compared with staffing costs. Clinically-led process redesigns, however unfashionable, are vital. No project should proceed without process improvement, to bring about gains in productivity and clinical quality.

vii) Elective (or planned) care and acute /trauma care require different competencies, and different management and system parameters. We decided therefore to split as much of the elective and planned work as possible away from the trauma centre at Middlemore to a more specifically designed setting. The hospital has a significantly constrained architecture orientated primarily for acute and trauma care. So the Manukau SuperClinic™ was established as the main elective surgical and planned outpatient care site. This was also in line with the preparation for the second hospital site at Manukau.

viii) We were working with a busy operational hospital. We had to commission and construct around patients, and move them where necessary to avoid disrupting treatment processes. Traditional full fixed design and build does not work in such a context. We therefore allowed for significant flexibility, and managed contingency issues through strict processes agreed by the contractor and participants. These disciplines ensured that scope changes and risks were controlled during every phase of every project, and allowed plenty of time to implement the outcomes of value engineering processes, which proved invaluable for staying on budget.

Thirdly and finally, the Labour/Alliance government elected in 1999 has signalled a move to early preventative care and an investment in primary/GP care. The new paradigm was “integrated care” and our programme needed to recognise this.

The involvement and leadership of clinicians is absolutely vital. They are the people who have to make the system work. SAH adopted the approach that all major decision-making, including the Board Project Steering Group, should have significant clinical representation.

The clinicians have the right to review and over-rule various aspects of the project, and lead the process design review. The Steering Group (including the Board and Senior Clinical staff, would set the broad parameters, broad scope and outcome. They would then hand the process over to the project team (also clinically led) who would research, design and participate in the value review process. This involves extensive research and trips overseas. Often clinicians involved in other building projects were consulted for expert advice.

Once overall strategies have been determined and the long-term structural elements and planning assumptions are agreed upon, then patient demand and disease patterns and distribution must be analysed. The analysis is based on well-understood epidemiological knowledge. In South Auckland the low prevailing socio-economic status and the large number of children (95,000) require provision for growth in the diseases associated with deprivation, and for specialisation in children's health. Therefore we designed specialist care into emergency facilities and the Kidz First™ Children's Hospital. We also catered for a significant projected increase in the diseases of the chronically unwell, particularly diabetes, congestive heart failure and respiratory disease.

An analysis of demand was then undertaken and the results built into the hospital's capacity.

Much of the capacity planning for hospitals is done using averages. The fact that hospital demand, particularly for acute services, is stochastic and not deterministic has escaped many hospital planners. It is unsatisfactory to use averages, ignoring variances or standard deviations, and failing to take account of probability regarding length of patient demand, and fluctuations and inpatient/outpatient capacity. Yearly averages and yearly volumes are not sufficient either. Hospital demand fluctuates markedly within a year, as it does within the week and sometimes within the day. It is a question of realistically forecasting, managing and planning patient inventory levels.

Limits to capacity must be set. This must be done unit by unit, and individual units' capacities and limits must be integrated into the overall hospital design. The capacity of Middlemore Emergency Care (EC) was designed at 100,000 patients, peaking for the winter (averaged). This limit was set because you cannot run an EC department with more than 100,000 patients per annum. The acute hospital departments were then sized accordingly, as the majority of patients at Middlemore long-term are likely to be acute. Once EC reaches this number a new hospital is required. These limits are fundamental because volume flow and volume management needs to be right-sized throughout the institution.

4. PROJECT AND SUB-PROJECT DEFINITION

The SAH re-development began in 1996 and was substantially completed in September 2002. Including the SuperClinics™ the project totalled \$160 million and was funded by borrowing offshore, based on a solid SAH financial operating position. All sub-projects were completed on time and to budget and are performing close to operational and business expectations. Strategic and operational goals have generally been met and many new clinical processes developed under revised operating philosophies and models of care are proving to be effective. There is however always room for learning. The object of this report is to provide a tool for managers about to embark on complex health developments.

South Auckland Health applied the philosophy of involving user groups in physical design and process change. If it is managed well, involving users will not slow down the process, and will enhance the long-term performance of a hospital. For SAH this approach was a huge help in terms of people "buying into" the required process and cultural changes, and it therefore reduced the long-term financial and people costs of the project. When the Acute Hub was commissioned, for example, the transfer to the new facility went extremely smoothly (and it needed to) as it was "owned" by both the project team and SAH staff. In areas where we were not so good at engaging the staff, we didn't do so well!

4.1. The Programme consisted of 20 Sub-Projects including:

- Ambulatory Care SuperClinics™ at Manukau and Botany Downs
- Acute Hub, including Accident and Medical (adult and paediatric), Coronary Care Unit, Intensive Care Unit, Cardiac Testing Unit and Staff Centre
- Kidz First™ Hospital, with 85 Beds, and a specialist Burns Unit
- Support services including a new Pharmacy, relocated Laboratory and refurbished and extended Kitchen upgrade
- Women's Health Foetal Assessment Unit
- Manukau Surgery Centre, with six theatres and 80 beds (with future expansion built in)
- Academic Lecture Theatre and Deanery (office)
- Galbraith Building Ward and Plant upgrades
- Adult Medical Centre, including Renal Facility and Catheterisation Laboratory
- Associated road, parking, security, infrastructure and IT upgrades

4.2. The Challenge of change:

As a result of a deliberate and continuous challenge process, the original sub-projects were from time to

time modified or re-prioritised. Dealing with these changes as the project evolved, in conjunction with input from other parties, forced the organisation to be responsive and adapt its processes and service delivery. It is not always possible to identify the ideal result until the project has evolved through certain phases. This is because the health environment is ever-changing, and because people come on board and contribute their ideas or influence at various stages of the process.

Although it is desirable to bring in key players early (and every effort must be made to do so) it should be recognised that this does not always happen in practice. Decision and change processes must therefore be monitored and integrated carefully with progress on physical design and construction. Managing this dynamic was one of the critical project success factors and is an area where a team's healthcare strength and experience comes to the fore.

5. THE PROJECT TEAM, CHANGE MANAGEMENT & COMMUNICATIONS

The importance of the team participants cannot be over-emphasised. It is not possible to have all the members 100% ideal, but the relationships and communications skills and attitude of all involved must be well above average. The chosen leader must be given the mandate (within reason) to choose and work with a team suited to his/her style, who are proven performers and motivated – who want to be there! It is important to think about team dynamics and then set the team up to succeed. With hindsight we have identified three determinants of project success: i) the dynamics of the team itself; ii) administrative disciplines iii) soft or human skills. These must all be considered in the context of change management and communication.

5.1. Six essential components of the programme team:

- 1) An experienced and competent governance team with decision mandate, either at Board level or delegated to a board sub-committee. A person with project experience is useful on the Board for the duration of a project; this often expedites decisions. Ideally this Board member should be available for consultation between monthly meetings.
- 2) An experienced competent Project Manager or Project Director. For SAH this person was in-house and reported directly to the CEO.
- 3) An experienced competent project sponsor (business manager(s) who work well with the PD/PM/leader). On a large project it is also necessary to arrange supporting project owners from within the business organisation.

POs carry out the day-to-day functions of the project sponsor, and manage internal integration and the organisation of user groups on behalf of the sponsor, in conjunction with the PM team, Quantity Surveyor and designers for each sub-project. The PM and Sponsor formed a “mini-governance” structure for sub-projects. 4) An effective Steering Group, including: the PM, CEO, sponsors, clinical and/or business managers, user representatives, risk management team, finance, project champions and other support services as required. This component allows particular sub-project representatives to report to the Board or board sub-committee as required. The freedom to co-opt as required is useful. This team must drive internal direction and decision-making to provide clarity to the delivery team.

5) Champion(s), who need to be involved early on, convinced of the benefits of the project and used as effective selling/buy-in persons. A respected high-profile clinician was used at SAH. Choosing and working with this person is a critical success factor. Consistency and continuity of this type of input and clinical leadership is vital when new processes are being integrated into design.

6) Experience and knowledge of the wider health sector in the governance team is essential, ensuring that rigorous solutions are attained. This seems obvious but is often overlooked during the critical change management and early development phases. Travel – in search of ideas and to look at facilities in action – is invaluable and can help consolidate project thinking. Concept architects, business managers, project leaders, key user group representatives, clinical and support staff can all take part in fact-finding tours. Before the start of the project, key staff travelled to America, Australia and the UK, which resulted in the consolidation of ideas and also facilitated the team “kick start” of the SAH project. Such fact-finding missions can be scaled to suit a project, and the costs are insignificant in terms of the operational costs of a wrong outcome.

5.2. Five backbone administrative philosophies:

- 1) Unity of command and information flow
- 2) Clear & robust decision-making processes, mandates and timing
- 3) Effective control, approval and cost management of scope (and scope change)
- 4) Excellent financial control systems
- 5) A formal (and informal) internal and external communications strategy

5.3. Five essential “soft skills”:

- 1) An ability to control and minimise the negative impact of unconstructive team members. It is important

to create a positive atmosphere and to recognise, listen to and reward (or acknowledge) in some way those who challenge or criticise in a constructive way.

2) Intelligent and pragmatic risk identification and mitigation processes. The project needs pragmatic systems and the application of a sensible risk mitigation process, blending experience, intuition and common sense, and including operational and business risks, and in particular change management issues. It is useful to have the risk system critiqued externally on a regular basis to check its effectiveness.

3) Leadership (of the overall programme and each of the sub-projects) that takes account of project-specific systems and the people and groups involved. In other words, “horses for courses”. Projects do not just happen – they must be made to succeed through leadership under each set of circumstances! Leaders need to approach every element of the project with a passionate and healthy urgency, bringing people along through involvement and input. They should look to find where leadership and passion are missing, and coach and encourage those struggling with the change process.

4) A project culture should be developed to reflect and complement the business culture of the organisation undergoing change. Business managers require regular engagement on project issues – especially the nominated project sponsors, to ensure they are managing organisational change and keeping up. Treat the project as a change management opportunity.

5) Make it a growing and rewarding experience for all involved. Sell the big picture and real social benefits to motivate them. Keep the patient and clinical performance in focus. Emphasise the purpose of the development – to provide a facility, processes and technology to enhance the already respected performance of clinical staff, and to provide a better health service for the people of a region or community.

5.4. Change Management

For many of the clinical services new processes, procedures and policies will be developed for implementation in the new facilities. The Project Director, by maintaining communication with the CEO, can ensure that General Managers and clinical leaders take responsibility for developing and implementing change management plans in their departments. A philosophy of organisational “cross pollination” of ideas and benefits is needed, as opposed to “silo” thinking. Real skill is required in change – it is an art; so make sure experienced people manage it for or with you. The most effective approach is often learnt only through experience. For example, letting people describe the current organisational position to you, rather than assuming or telling them where it sits, can help open people up to change and provide a factual starting point.

A sense of calm, focussed urgency is critical and repeated messages are needed to reinforce changes in culture and process. The management of change is critical for the entire organisation throughout and beyond the project phase and into the future. As a starting point, a generic process or structure for managing the acceptance and implementation of new service procedures must be agreed and established. The *acceptance* of change, which requires communication to bring about understanding of the organisation’s vision and direction, is however the key.

The actual “line diagram” process and disciplines used to manage the change process is important, though secondary.

The development and agreement of processes between the operations and project teams is a good way to gain mutual understanding of change requirements, and thus buy-in; and it can form a “contract” determining how people will work through issues.

Once these processes or basic team rules and behaviours have been set up to manage organisational and project change we can then move on to develop and consolidate the details of the new business operations and master plans.

5.5. Communicating the plan to external organisations

Once all the decisions on existing and new clinical services have been made the multitude of service deliveries must be communicated to the designers. Managers, clinicians and nursing staff need to do robust work prior to the involvement of the external project delivery team. The PD must make sure this happens, possibly using experienced outside consultants.

It is advisable as part of this phase to document an approved-by-management project-team brief, based on agreed internal business plans for sub-projects, and reconciled with the overall business direction. The briefs are subsequently developed into an overall diagrammatic master plan. This master plan, combined with a milestone timeline for the programme, is a very powerful tool for selling the vision to everyone involved. It helps encourage and consolidate change organisation wide, and discourages “silo” thinking.

Communication, feedback and confirmation of shared knowledge ensure that the whole team becomes greater than the sum of its parts.

Once this high-level understanding is reached, it must be converted into a project scope with an associated budget. Remember that a lot of work will already have been done on broad-brush scoping and budgeting during the preparation of the business case; consolidation and refining is now required. This will require input from

external experts and consultants. All work streams must progress in parallel, and must be continuously reconciled so that new processes and designs are fully co-ordinated.

At this point the project team would generally include the Project Director acting for the client (including clinicians and hospital staff), the master planner, the architect, the functional space adviser (who may be the architect as long as they are experienced in this area), the services concept engineer and the client financial adviser, who may be an independent QS.

Before moving on to the detail or developed design stage (of any project) the full gamut of needs must be reconciled with budgets robustly, taking into account all costs. I suggest strongly that experienced people should be involved here. The project succeeds or fails depending on how well this is done. This is where an effective Project Director must engage with management (and clinical staff) on the client's behalf to help them see the real picture, and to facilitate communication through to the project team.

Above all, make no assumptions about costs; and ensure that the following costs, which should be obvious but are often forgotten, are covered: internal resources (for internal Project Management, site facilities and equipment purchased internally for the project); IT, including management and implementation; testing of systems; equipment procurement; internal procurement; infrastructure upgrades; security; road and parking re-alignments; staff training prior to moving into new facilities; commissioning and set-up; and of course recurrent operational costs, including building life-cycle costs.

Cost control of every one of these items must be set up, consolidated and reconciled. This cannot be emphasised enough! It is advisable to set up an organisation-standard template for business cases at the outset, to include or at least account for all facets of cost, taking a “triple bottom line” or “balanced scorecard” approach.

Unforeseen costs arise, especially in a fast-track or volatile environment, and often changes are beyond a single organisation's control. The secret to containing change and minimising the resultant risk is to have an effective system for considering flexibility and cost-benefit options strategically on the basis of excellent information, through clearly established decision mandates.

Keep the system simple; and above all get the right information to the people with a mandate to sign-off on change. This instills accountability early on. Don't be afraid of change and consequent re-prioritisation – just be prepared to manage it and mitigate the risk! By all means spend time if you have it on crossing the t's and dotting the i's, but there is generally a trade-off between

perfection in design and working within time constraints.

Without losing sight of detail, don't sweat the small stuff.

6. USEFUL TIPS ON PROJECT PHASES & IN-HOUSE PROCESSES

6.1. Developing clinical streams, models of care and operating philosophies

It is essential that a strategic plan be developed prior to the detailed planning of a project. The strategic plan serves as the high-level reasoning or foundation stone for a project. Each projects should implement the relevant part of the strategic plan, and should be a rational outcome of the strategic planning process. The justification for adopting particular project alternatives should include the following:

- service area population
- demographic characteristics
- health status characteristics
- analysis of current hospital services
- financial & resource constraints

Once service delivery requirements and capacity are confirmed, the model of care for each service needs to be confirmed rigorously prior to concept design, and reconciled with the operating philosophy of the service. For example, the SAH philosophy is to separate adult and paediatric A&E care; this done, a central nurse station or a race-track model of care may be adopted, depending on staffing, technology and clinical issues.

Critical operating philosophies and models of care must be led and communicated internally to be effective long-term. The process can be externally facilitated, though to be successful the outcomes must be internally driven.

All the information, when collated, must be moulded into a master-plan. This document serves as a great communication tool, but more importantly establishes disciplined milestones for progress.

6.2. Master Plan

The Master Site Plan should represent the most current thinking regarding the ultimate development of the Hospital site, in line with the clinical strategic direction. This Plan includes the current land use (buildings, roads, and access), and projected use. Future plans should include proposed building developments, expansions and demolitions, parking, land acquisition. The Master Site Plan should also indicate such physical

constraints as flood plains and retention ponds, and the availability of utilities. The Plan should:

1. Provide a road map for the future development of the site to ensure that any particular development plan will not be precluded by the limitations of the campus.
2. Identify the site, zoning, building, and land use constraints and other legal restrictions that could limit or affect proposed development, so that site or programme alternatives can be evaluated.

Allowing for the change-management constraints discussed earlier, only once the master plan (or key parts thereof) is signed off should the team move into concept and developed design and procurement for the physical execution of the project.

6.3. Pilot new processes

Once a particular process or model of care is developed it is wise to pilot the scheme, if possible, before roll-out in a new facility. Electronic discharge summaries from an A&E department is a good example. Pilot trials iron out teething problems and facilitate staff buy-in.

6.4. Feasibility and recommendations

Once analysis and consultation is complete, the business case should be submitted for approval by the board (or board representatives) for each recommended sub-project option within the agreed master plan. This should be co-ordinated by the Project Director, who must ensure that the management and the board are involved and informed throughout the process. If this is done well, approval becomes a formality.

6.5. Board approvals

The approval of many projects is delayed because insufficient or wrong information is passed to the decision-makers. The solution is simple – ask them what they need to enable them to make any particular decision. Take the attitude that their ability to make a decision is directly proportional to your good work. On the financial front, painting a pessimistic or optimistic picture too early helps nobody and creates re-work and frustration later. An accurate account of the realities is what people need, and some detailed research will be required to ensure that this is delivered in a robust form early in the process.

Remember that managing the process of referring decisions progressively up the management chain is the key here. You must be flexible, courteous and intelligent in your approach; and above all, do your homework before presenting anything for approval.

If you have done all that is possible and a decision is still not reachable, point out to the board the consequences clearly and calmly (you must have these

consequences clear in your mind and anticipate this discussion). Help the board with contingency ideas and give them realistic latest dates for decisions. Avoid rushing to a wrong answer!

By supporting the information chain at every level, accurately and in a timely way, you have done your part in promoting good decision-making.

6.6. Project Set-Up

An internal business Project Execution Plan can be drafted at this stage of the project. It should be kept very short. Only critical and realistic systems and lines of communication need to be included. If kept succinct, it actually forces critical thinking and draws out effective processes worth embedding into the project. It is a good strategy to get the team members to draft this document themselves, with external help if required.

The required systems and processes will fall into place if the project culture is right. As external third parties become involved they can be integrated into a project execution plan. Projects tend to collapse when basic systems, disciplines, leadership and or experience is overlooked at critical stages of a programme's life-cycle.

A key concept is unity of command and communication. This knits all the processes and systems together, and survives the hard times when the systems are under pressure. It should be the responsibility of one person with an able assistant or "vice president"

Put simply, this requires single points of accountability and a single line or "clearing house" for ALL information.

There should be one person who makes decisions at each specific level of command. The types of decision allowable, delegated authorities and communication channels once decisions are made must be clear.

This "frees up" the project team to lift the level of their performance.

6.7. Project-related decision mechanisms and mandates

The CEO and Board will be the ultimate decision-makers on policy and final project expenditure, within the integrated master plan and budget.

Recommendations will come to them from the project steering group, having already been approved by project sponsors and their governance teams. This decentralisation of project decisions is good for change management.

The quality of information is critical, and decision-making teams at every level should be asked for their requirements in detail well before a recommendation is to be made.

A “warm-up” paper in advance of an approval is well worthwhile.

The report work of the Project Management team needs robustness and accurate. It is a good idea to develop a comprehensive checklist to make sure that all aspects of a sub-project are covered. Most cost over-runs come from omissions of scope or associated works (as a result of misunderstanding rather than deliberate) and fewer from grossly wrong initial estimates. The message is to be thorough and comprehensive in costings.

Finally, allow plenty of time for decisions; don't put undue pressure on the Board because you have not planned ahead.

6.8. Project Control Groups/Processes (PCG)

The PCG is extremely important in the day-to-day, week-to-week execution of a project. It deals mainly with project and contractual issues. It would typically include the Project Director, the architect and consultants, the contractor, internal project resources and the financial QS. Regular monthly meetings are normal, but information should flow freely within this group both formally and informally, and continuously.

Good formal communication systems are needed. Variation control and signoff is an example of a critical control system, and probably the most important. Link the systems to business decision mechanisms so they can be effective at governance level to close the loop in terms of organisational accountability. Keep them simple and easy to use and have a top-quality filing and retrieval system.

Develop a project rhythm for reporting and decision-making. This requires forethought and planning so that information is communicated to all levels in a timely way. A good PD will anticipate issues well ahead of others, and manage the team accordingly.

6.9. Concept design

The consultant team needs to be guided to ensure that they execute each level of detail at the right time. Too often they will go too far, then claim back time when requirements change. Again communication is the key: let them know if there is any uncertainty, and how far they should proceed with any particular aspect of the project. This applies particularly at the concept design stage, and they need to allow for a number of iterations before getting the right answer.

So research and find a top-quality master-planning and concept architect, who listens and has good ideas. The more work done at this stage of the process the better, to ensure a steady, robust and inclusive process.

The ultimate project and long-term operational risk profile of the organisation will be determined during this phase.

6.10. Engineering systems analysis at concept design

Make sure the on-site engineering systems such as stand-by power are considered very early in the design process. Involve the maintenance and facilities team in analysing the life-cycle options and ongoing maintenance requirements of new facilities. An inevitable conflict will arise here: the tendency of the facilities engineering department will be to standardise everything to facilitate ongoing replacements, while the design team will want to upgrade everything, exercising flair and ingenuity. So this relationship must be developed early in the project. Be prepared to manage this natural mis-match of cultures between engineering departments and project teams.

6.11. Developed design and construction

Once concept design is complete the developed design process may begin. This phase is often overlapped with concept design to accelerate the programme as stages of work are confirmed step by step. This is fine if it is managed well and the risks of change are mitigated.

Continual contact with user groups is important during developed design, but they should not be able to hijack the process once key decisions have been made. They need to be fully aware of the agreed concept and associated budget. If the concept is at risk of change, higher management must become involved immediately.

Developed design needs to be reviewed for content and cost at the 80% stage. It is better to do this at concept stage and then once, properly, at around 80%, than three times at 50/75/100 etc. People get sick of it and do not do it properly. Assuming that adequate input has occurred throughout, formal approval at concept and 80% design is fine; and if people are given enough warning and are able to set aside enough time this is the way to go.

At 100%, or construction design stage, have a final review with key players including the QS and contractor (if you have one at this stage). Make sure some practical buildability is integrated into the design. For ideas in specific areas – for example air-conditioning in theatres – you can involve specialist sub-contractors on a consultancy basis.

If the traditional method of procurement is being used and a contractor is not yet involved, it pays to get in some buildability advice at 80% at the latest. For completeness construction procurement is discussed in a later section. For the sake of continuity, occupancy of new facilities is covered in the next section

7. OCCUPATION AND START-UP OF NEW FACILITIES

This should entail lots of pre-planning and involvement of the staff. One of the great advantages of having user input into the design process is that they will be self motivated when it comes to occupation and start-up. They will see the facility as theirs and will want it to work and will do so for years to come.

7.1. Transitioning facilities in today's health sector

Is it possible in today's environment to have a clinical facility occupied and operational within 48 hours of its being handed over by developers? The answer is yes, as long as the transition documentation, communication network and clinical/project team involvement is inclusive and co-ordinated so that it is accepted by those at the "shop floor" level.

The transition phase consists of a pre-commissioning period, (recommendation three months), along with commissioning (recommendation two weeks) and post-commissioning (recommendation three months) periods. It is important to recognise that the transition period requires additional resourcing and that these costs need to be identified and agreed to many months in advance.

The core transition team is recommended to consist of "occupiers" of the facility, representing managerial, clinical and clerical staff, to ensure that the transition period is progressed by like-minded individuals. The expectation is that the "occupiers" know the business best and that each core member will take responsibility for setting-up, familiarisation with, and management of their designated areas during the transition period. Working along with this core group will be individuals or "users" of the facility, representing materials management, pharmacy, sterile supplies, security, linen, communications and hotel services etc. This group is supplemented again by an Information Systems support team, which is charged with installing the computers and phones to user specifications.

7.2. Operational Perspective

Gantt Chart

The Gantt chart assists in the programming of tasks by helping identify the critical milestones of the project,

and what needs to be in place from an operational perspective prior to occupation.

Transition Meetings

Transition meetings begin as a communication forum of construction workers, clinicians and project managers. They help ensure that expectations concerning deliverables, responsibilities and timeframes over the transition period are documented and agreed to. Representation from security, materials management, pharmacy, hotel services, and procurement is enlisted to formalise requests for information regarding imprest lists, cleaning standards, networking plans and security programming for lifts, doors, and swipe cards etc. Written memos detailing these things over the transition period are sent to each representative to ensure a timely transition.

On the SAH project, two additional meetings, similar but larger, were scheduled six weeks in advance, as a general communication forum for the wider organisation.

Transition Budget

Additional costs that sat outside the operational and project budgets included additional staff required to set up the clinical areas, and relief staff to cover user familiarisation tours and preparation of documentation prior to "going live". When "going live" additional staff were required to ensure patients' safety, while staff got used to working in a new environment, with new technology, processes etc. Catering, signage, cleaning, waste management & security requests justified a separate transition budget.

Procurement Meetings

These vital meetings were held weekly to develop processes for ensuring that equipment, furniture or fittings were bought and/or installed (by vendor, client or supplier) efficiently and quickly.

Transition period support documentation

- Equipment relocation lists, giving old and new locations
- Asset register of existing equipment
- Notification/communication checklists – who to inform of what, when
- Device relocation lists – old and new locations and networking requirements for computers and telecoms devices
- Equipment plans, showing new equipment, and its cost and location within facility
- Floor plans indicating areas for clinical clean, sealing etc,
- Imprest lists for stocking
- Buy-in lists

- Variation lists, stipulating owner, supplier or vendor
- Equipment/furniture/fittings supply and installation lists, clarifying parties' responsibilities
- Phone lists indicating individuals involved in the relocation
- Clinical memos detailing timeframes, deliverables, responsibilities, contacts etc. during the transition period. For example, materials management was required to stock shelves to previously determined imprest levels.
- Communication group exchange memo, informing the organisation of changes

Note: The usefulness of the lists varied, depending on who used them, for what purpose and how much rework was required to make them useable. This is an area where efficiencies can be made across multiple projects. Knowing how to complete the lists and when the information needs conveying and to whom is vital.

User familiarisation

User familiarisation manuals were produced as a central point of access to information regarding the new processes etc. required operating in the new environment. A welcome letter introducing the facility was also prepared, which could later be modified as an orientation letter for new staff.

Familiarisation of users with the facility included rostering all staff into a fire evacuation training session, followed by a walk-through of the facility showing how the new technology, equipment and processes worked in the clinical environment. To add a personal touch, members of the transition team should be available on site for 48 hours to personally orientate staff members and for trouble-shooting.

Commissioning Period

An issues list should be started on day one of opening, detailing the issue, who has raised it, who has been asked to resolve it, and the date of resolution.

Transitioning recommendations

The project group needs to make decisions that complement the operational aspect of the business. The two groups cannot work in isolation. Therefore the project manager should ideally have good operational management skills.

To speed the decision-making process, the clinical sponsor/owner needs a high level of confidence in the project manager. To engender this confidence good communication is needed during all project phases. A philosophy of "no surprises" should be adopted.

An organisational discussion is needed to decide the length of the transition period, because there are some opportunity costs associated with both longer and shorter transitions.

Some design issues were overlooked when documents were signed off, because users lacked understanding of the process implications.

Another issue is compliance. Decisions made to meet fire regulations etc. directly impacted on the operational flow of the facility, resulting again in rework in response to requests from users. Compliance regulations need to be in the forefront of the users' mind as they consider traffic flows and security measures etc.

Site visits need to be controlled and used to encourage and inspire users of the facility only. Banning site visits in the final months of construction proved detrimental to the transition process, as it prevented staff from imagining what it might be like to work in the area.

Information resources should be made widely available to help project managers in their work. They should include:

- Templates of operational plans, transition plans, transition budgets, Gantt charts, issues lists, equipment plans with virtual rooms and costs associated with the items in the room
- Contact numbers of employees with project / change management expertise & experience
- Descriptions of the roles associated with the various titles held under project structure
- Definitions of terms such as scope of a project, risk, signoff etc
- Textbooks for consultation by clinical staff involved in decision-making.

Staff debriefs should be the norm and not the exception.

For the benefit of users, clinical, hotel and materials management, security etc. should be consulted to establish a priority listing of products or finishes that operationally impact on quality, flexibility and cost over time. This process should assist with budget allocations at the beginning of a project.

8. CASE STUDIES USING POST-OCCUPATION REPORTS

Lessons Learnt and Some Project Results

The SAH Facilities Modernisation Project has been dramatically successful. As each sub-project was finished a Post Occupation Review was completed approximately six weeks after the transition. Lessons were learnt from earlier projects and incorporated into all subsequent developments.

The table below provides real examples of post-project analysis. It lists some of the valuable lessons learnt during the SuperClinics™ and Kidz First projects.

8.1. SuperClinics™

Issue	Lesson learned
Clinicians and management worked well together.	The clinician/management relationship has been formalised throughout the organisation. All projects have specified clinical input, starting with joint project ownership between General Manager and Clinical Head.
A model/mock up room was built where clinicians actually held clinics	The concept of modelling a clinic and gaining actual experience with its use, was incorporated in all projects, including the stringing out of the new Acute Hub floor plan on the back lawn of the Hospital.
Good quality without luxury was preferred – long-wearing and low-maintenance construction and materials.	This standard was applied throughout the facilities modernisation programme. Such things as steel door surrounds and easily laundered carpet have proved their worth.
Introduction of too many new technologies at commissioning proved sub-optimal	Introduction of new technologies must be phased for good take-up by users.
Clinicians were not involved in earlier site visits to review new technologies.	Clinical staff involvement in such visits was improved subsequently
Loss of corporate knowledge and expertise was recognised as a potential problem.	Staff with good institutional knowledge who did not fit into new environments were accommodated in appropriate alternative roles so that expertise was not lost.
Hand over of the project to the operating staff was done too early.	Project budgets and cost/benefits should include appropriate hand-over periods.
We underestimated	Specific data was gathered to

the implications of two sites on staff numbers	prevent this recurring.
Inadequate change management allowed the basic project philosophies to be diluted.	Detailed change management became a key component of all projects.
The project itself was under-resourced.	The methodology for calculating project resources was revised.

8.2. Kidz First™

Aspects Done Well	Current/Future Practice
Project Management and Clinical/Management Leadership	The project's success was due to an excellent partnership between an experienced project manager, a clinical director/champion and an operational group manager. The Consistent User Group is another key success factor.
Field Trips/Fact Finding Tours	Team trips were used to identify reference sites. The sub-project teams undertook extensive fact-finding tours prior to establishing the project brief.
Process Changes and Inter-Speciality Relationships	Special relationships with support services and other clinical services were developed to the benefit of all parties. Service Level Agreements provided a basis for these relationships. Ongoing clinical and operational liaison defined and cemented process change and inter-speciality relationships.
Communication	- Road shows were an excellent vehicle for educating others on redesigned processes. - Unions were involved from the beginning of the project, and kept up-to-date on developments affecting staffing and Models of Care.
Service Level Agreements	Service Level Agreements were developed for each new facility being developed. Shortfalls and opportunities for service development were identified and closer relationships fostered between new facility staff and

		other services within South Auckland Health.
IT Lessons		Preparation for new systems required extensive discussion and planning. The results varied significantly between services and the process required much more time than anticipated. Clinical champions providing leadership and advice were extremely important.
		Piloting functionality proved very useful for identifying issues and expediting their resolution.
		The Transition period must be long enough to fully test infrastructure rollouts
		Executive sponsorship of new software was interpreted as extremely positive, and set a new standard for the organisation.
		Information services must actively participate in the design process.
		Effective cost controls must be in place at the start of the project and maintained throughout the project lifecycle.
		Roles and responsibilities should be clearly defined and actively reinforced throughout the project lifecycle.
		Project managers need highly effective communication skills.
Building Design Lessons		Products and materials now incorporated into standard specifications for South Auckland Health include wall finishes, paint to wall, wall protection, floor vinyl, shelving within joinery units, door finishes, lighting and sliding door mechanisms.
		Increasing the robustness of wall protection/cladding is clearly beneficial to durability, and provides cost-benefits.

9. PROJECT PROCUREMENT OPTIONS

Typically, the permanent long-term financing for a major capital construction program is negotiated and approved prior to the completion of design and often

before firm bids are in hand. This is done through QS estimates based on concept design. The process of refining concept designs and costs and firming them up is iterative, converging towards certainty over time. An organisation's risk profile and the point at which it needs cost certainty, among other determinants, can therefore dictate the method of procurement.

It can be argued that the ultimate risk of cost and time generally sits with the client, so the management of risks throughout a contract should be allocated to the best and most able party.

In some situations, and depending on whether a project is isolated or part of a larger programme of works, financing may occur at the time when a “close to final cost” is available. This can be provided as a guaranteed maximum price (GMP) or Design Build lump sum, either of which can be arrived at prior to the completion of design. A GMP is a firm contractual price provided by a contractor for a single defined project, who guarantees to build the building for a given price based on concept plans and specifications. Design consultants are then either novated to the main contractor or replaced by the contractor, who then develops the concept design within budget to an agreed level of functionality and performance. GMP can be risky to inexperienced clients, especially an early GMP. Advice should be sought before entering into any form of procurement.

There are other options if the full scope of works and therefore costs are unknown at the outset. For example, sub-project designs can be progressively developed once a management contractor has been appointed. This appointment would be made via a competitive process based on the Head Contractor's management costs and margin (P&G and margin bid). The trades are then converted from estimated provisional sums to fixed prices by means of competitive bidding. This does not provide early cost certainty, however, and the risk tends to lie entirely with the client and not the contractor. Depending on the risk profile of the organisation this may or may not be acceptable.

Firm bids are generally desirable prior to completing the permanent financing transaction; the project budget should be well defined in order to accurately size the required debt or funding proceeds. A funding shortfall could occur if the financing is based upon a preliminary cost estimate that is below the actual construction bids. And conversely, if the bids received prove to be below budget once the financing is completed, borrowing is unnecessarily high. If time allows, the ideal situation is to have a full design completed, with “buildability” issues resolved and a competitive tender process carried out. The benefits of keeping things moving in parallel tend to outweigh those of a step-by-step controlled process. This is why good project managers are required, and must be supported by effective systems.

In any case, preparation for financing should be done early on, and normally well before the receipt of final bids. This is required so that financing can be complete at the appropriate time to ensure funds are available to start construction. At the least financing should rely on quality QS estimates on a fixed and comprehensive scope. Significant scope changes incur major risks.

It is advisable to leave some “strategic contingency” within the total finance to allow for Board decision-making. This is essential especially over a long development period in which change and re-prioritisation may occur. It is not ideal to have to return for more financing. This contingency is separate from the construction contingency. Contingency amounts should be inversely proportional to the certainty of scope, and directly proportional to the risk of unknown design/physical conditions.

A final word on risk: an error in design or process will last for many years and will cost the business on an ongoing basis. Capital cost risk, although high, is less critical (unless there is a major mistake). The importance of the early “in-house” work on building project scope before the detail design and construction starts cannot be over-emphasised.

9.1. Procurement

The most frequent construction approaches are traditional general contractor, fast-track, phased construction, design build, and construction management. More recently partnering and alliancing have become popular and should be investigated as options.

The preferred method of procurement for any project should be developed from the inside out; that is, starting not with prescribed methods, but with your needs, and working towards the best fit. This will typically be an amalgam of two or three options.

Considerations are:

- time requirements
- cost certainty requirements
- risk profiles of parties
- capability and availability of local and international consultants and contractors
- transparency and probity requirements
- market conditions
- economic and business environment factors
- previous experience
- intuition and market experience
- in-house skill and experience

No matter which method of procurement you run with, stick to it and get the best people involved. An optimal

procurement contract arrangement is necessary but not sufficient for success. The project team is the key, and must operate around trusting committed relationships, especially in a complex project environment.

In the following sections we discuss options, and in some cases have deliberately strayed from generally accepted definitions to provoke thought.

9.2. Forms of Contracting

Under the Traditional General Contractor approach, the client/owner (hospital) engages an independent architect (and possibly independent engineers and consultants) to prepare the complete construction package – complete plans, including architectural, structural, plumbing, mechanical and electrical drawings, and detailed specifications and schedules of quantities. The schedules form the basis of the scope and payment regime for the contract.

Following a competitive and rigorous tender and selection process a general contractor is then engaged to construct the project as designed.

In recent years construction contracts have sometimes taken the following forms, which can be considered variations on the traditional approach. Elements of each can be mixed and matched to suit the client needs.

- **Lump Sum:** the construction package is submitted to several contractors, who each submit a lump-sum fixed price for the construction of the project.
- **Guaranteed Maximum Price (GMP):** a variation of the lump-sum approach. The contractor submits a “not to exceed” price for the project with the possibility that the project may, in fact, cost less. The contract itself will define the circumstances under which the price may be less, usually depending on the cost of materials and labour purchased (i.e. subcontracted) by the contractor. A share-of-savings regime can be built into a contract to create an incentive for both parties to co-operate to meet budget targets or better. A two-stage GMP process is also possible, where savings are shared only on a second contracted GMP price. The first stage GMP is a mechanism for selection of a preferred contractor based on an agreement to work towards a second and contractually binding GMP.
- **Cost Plus:** a contract may provide for completion of the project on a “cost plus” basis, i.e. for costs plus a fixed or percentage fee.

- Design Build: the owner contracts with a single entity for both the design and the construction of the project. The “contractor” may be a joint venture consisting of an architect, an engineer, and a contractor; or it may be a contractor who personally engages an architect. The intent of the construction contract can include provisions for fast-track or phased construction.
- Negotiated Contract: this approach can be utilised with a lump-sum, design build or GMP contract. The difference is that rather than putting the construction package out for competitive bids, a contractor is selected for the project. This approach is used when a particular contractor is desired because of its reputation or its unique capacity to construct the project. “Apples for apples” comparisons are difficult with this approach and a client needs to be aware of and experienced in value comparisons.
- Alliancing and partnering: teams work together contractually towards common goals.
- BOOT projects (or variations on the theme): private finance is supplied and an independent party may be involved in the development to own and operate the facility.

9.3. Fast-Track

- The primary difference between the more traditional approaches and more recent forms of contract is the “fast-track” approach. This is where incomplete plans and specifications (basic documents, schematics, preliminary structural drawings, etc.) are utilised in contracting with the general contractor. The advantage of this approach is that the time from the inception of the project to its completion can be reduced, since the design and construction phases are overlapped. The incomplete construction package is usually submitted to several contractors for preliminary estimates or proposals. The risks inherent in fast track construction are as follows:
- Because engineering is not co-ordinated at the time that the contract for the early phases of the work is awarded, change orders during construction may be required.
- The potential for litigation is increased if the completed plans and specifications represent a change in scope from the preliminary drawings (and, therefore, an increase in cost), or represent completion and refinement of the preliminary drawings (and, therefore, no increase in cost). Hence, fast-track construction requires a certain

degree of sophistication and experience on the part of the owner.

9.4. Phased Construction

Under this approach bidding for the construction work takes place in phases. This may be according to the fast-track construction approach whereby the design is completed, and then bidding is conducted in phases, construction being initiated prior to the completion of design. Alternatively, upon completion of design, it may be prudent to bid and construct the work in phases rather than awarding a lump-sum construction contract or multiple subcontracts at one time. For example, bidding for the renovation phase of a project may be deferred until near the actual start of work, since renovation is often the final phase of a programme also involving new construction. A contract for phased construction would take one of the forms described previously for the traditional general contractor.

9.5. Summary of Procurement Options

The foregoing overview of approaches to construction describes in general the normal relationships between the owner, consultants and the construction manager or contractor. The exact nature of the relationship in any given instance will be governed by the agreement between the owner and the contracting party. Therefore, the importance of the agreement itself cannot be over-emphasised and advice should be taken from experienced people.

Various procurement options must be considered. Choosing between them involves thinking about your risk, time requirements, where expertise lies, and how confident you are around the concept master plan. Remember that whichever system is finally adopted it could fail if not managed well. Success depends entirely on the people involved, their leadership, experience, organisation and commitment. So spend more effort on the “type of people” factor than on the method of procurement, which is often decided well before people are nominated.

The message is that once you have decided on a method, get on with it ! Certainly make contractual modifications or negotiate to strengthen your position, but focus more on the people. Don't think that because you have a great contract or methodology, success is guaranteed. It helps, but only if you get the chemistry and project culture working ! I would argue that any form of procurement can deliver outstanding results if a great team is managed well.

10. SUMMARY:

The essence of our learning during this programme has been the discovery and use of effective links between business change and physical projects.

Business change unfolds continuously in the context and trends of a particular industry and its wider economy. Whilst processes and people within an organisation must change to move with or influence these change forces, they must be given time and “room” to do so.

Capital projects of a large scale and intensity should be consciously treated as an opportunity to develop and embed new, better ways of doing things in the context business and industry change.

Organisations that can bring to projects a mind-set, skills and systems reflecting an integrated understanding

of the wider picture of business change alongside capital projects will succeed, and provide real value to clients.

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